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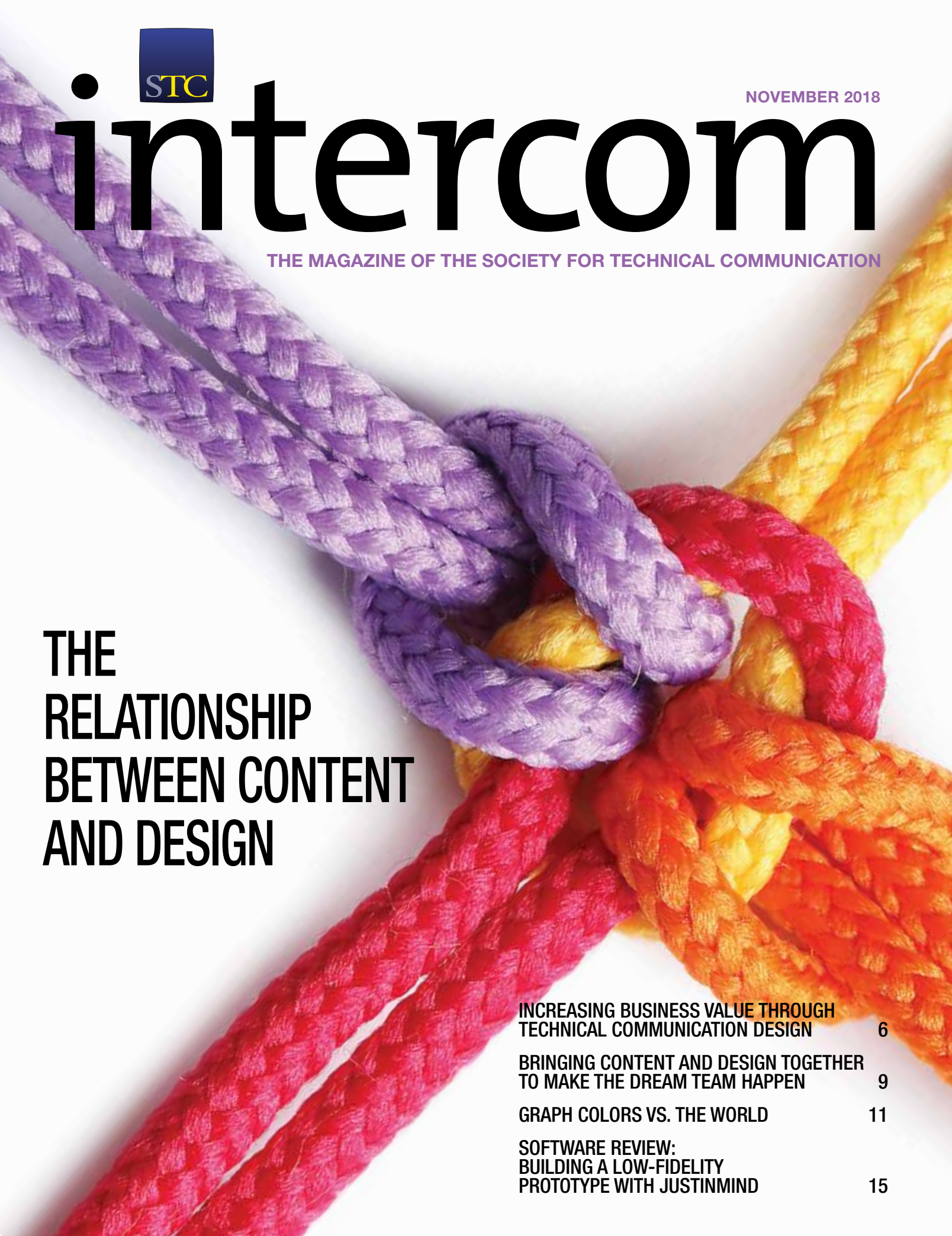

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A Note from the Editor

AS A TECHNICAL COMMUNICATOR who spent many years acquiring user experience (UX) and design skills, I am especially excited about this issue of *Intercom*. I recognized early in my career that the very best and most valuable content is created and delivered within the context of:

- A good knowledge of how the human brain processes information;
- A deep understanding of the specific audience for the content and what they truly need to be successful;
- A strong architecture, flow, and interactions for the product needing documentation;
- A visual language to complement and communicate the message in the words; and
- A user-validated design and development process.

Unfortunately, few of my employers through the first 20 years of my career embraced user experience design. While I was not always able to influence the design of the product with my UX and design skills, I could at least ensure that the content was the best it could be under the circumstances.

As Jared Spool alludes to in the first article of this issue, we no longer have the luxury of acquiring a few additional non-writing skills along the way and parlaying them into a little more seniority or extra salary. Even in companies serving highly technical markets, the tolerance of those markets for complexity is dropping dramatically every day.

In fact, I asked Jared to write his article after I watched him deliver "It's a Great Time to Be a UX Designer," the keynote address for CIDM CMS/DITA North America in April 2017. In that presentation, he told a room full of technical writers that creating great experiences requires a new breed of designer—a real-life unicorn—and one that embodies some level of *all the skills*: coding, visual, interaction, content, business, and audience domain skills. He included this slide to visualize his idea (see Figure 1).

If, like I did, you are mentally ticking off which skills you do and don't have, you might discover that you have more skills than you don't. I do, and the great technical communicators that I know do, too. As a result, I came away from Jared's presentation with an even deeper conviction that the technical communication discipline is likely the largest historical base of these unicorns.

In my 35-year career, I have practiced *all* of these skills at some point or another. In fact, I used all but visual design on a day-to-day or week-to-week basis during the last 20-25 years of my career. (I'm not a great visual designer, but I know the principles well enough that I can get by. It won't be beautiful, perhaps, but it will communicate correctly and effectively.) Taking this a step further, I believe that to be a great content (or design) architect and strategist, you need product management, business growth, and leadership skills, as well.

The connection, intersection, and relationship among and between content and design disciplines, skills, and professionals is something that I'm passionate about, and it's something that defines a significant portion of the future of technical communication skills and work. As a result, I'm thrilled to bring you this issue filled with perspectives on this theme.

Figure 1. Jared Spool's experience design skills slide, projected during his CMS/DITA North America keynote presentation.

To start us off, Jared Spool provides his perspective on our core writing skills and how they can provide essential business value when we strive to design our content for intuitive communication.

Next up, Jenifer Schlotfeldt and Missy Lim describe how to bring together essential functions of content and design to create a dream team that breaks down silos and creates a better experience for their audiences.

Then Jonah Schwartz dives deep into the subject of graph colors and how data visualization and the design of graphs affects multicultural communication.

Finally, Michael Opsteegh reviews Justinmind, a software platform used to develop software prototypes, and how it can be used to create low-fidelity prototypes for usability testing.

We also have three columns for you in this issue. Guest columnist for The Academic Conversation, Brandon Strubberg, provides a cautionary tale about predatory publishers and how to avoid them, in particular for academics. Kirk St.Amant delves into the cognitive load limitations of the human brain and how to overcome them through cognition, chunking, and design. Alan Porter describes the tension between technical communicators' love (and need for) structured content and the marketing need for creativity to gain engagement.

As always, don't forget to check out the Society Pages!

And last, but certainly not least, in Witful Thinking, Charles Lawrence reminds us of the value of having an elevator pitch handy when people ask us exactly what it is that we do.

The feature authors, columnists, and I live for your feedback! We provide our email addresses so that you can get in touch. We would also love to discuss any articles with you online—did you know that you can comment on the Web version of any article? Start or join a conversation! I'll be looking for you!

Until then, enjoy the issue!

Andrea Ames

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Increasing Business Value Through Technical Communication Design

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By JARED M. SPOOL

Writing's Value Add

In 2010, two researchers, Rob Walker and Joshua Glenn, embarked on an ambitious experiment. They wanted to see if they could manipulate the value of random objects by creating significance that didn't previously exist. They named their research project Significant Objects.

Their research started with eBay purchases of more than 200 flea-market-quality trinkets and knick-knacks at an average price of $1.25 per item. At the project's conclusion, they had sold their collection of trinkets and knick-knacks for more than $8,000. How they pulled off this transformation in value contains important lessons for how we think about the future of technical writing.

After each purchase, Walker and Glenn gave the item to a writer. That writer then composed a creative story specifically about the item. Walker and Glenn then posted the item for sale on eBay, with the new story as its product description. The average item sold for 28 times its original purchase price.

For example, one item was a small, hand-crafted, wood and cloth Russian figurine. They purchased it for $3.00. A writer named Doug Dorst crafted the story around the object, talking of how his grandmother used to tell the adventures of the person represented by the doll. His story described how his grandmother believed it acted as a good luck charm, saving her village from disaster. Whoever bought the figurine after Walker and Glenn put it up for sale thought it was now worth $193.50—64½ times the original purchase price.

We've known for a long time that people will pay for a good story. We'll pay good money for a captivating book, a compelling television drama, or an engaging movie. The biggest revenue from the entertainment industry comes from great stories.

Walker and Glenn's Significant Objects project shows us that an item can change value if we upgrade its story. Businesses can create value through great writing.

Translating Writing to Value

Around the same time as the Significant Objects project, my team was working on a project evaluating different ecommerce sites. Our goal was to identify the traits of the most successful sites, and how teams could ensure they were building a great site.

We asked shoppers to buy products they needed. Even though the shoppers had a good sense of what they wanted to purchase, they often needed to check details in the product descriptions.

Most retail websites copied product descriptions on their sites from descriptions the manufacturers supplied. The retailers didn't craft their own copy, partially because of their large inventory and partially because they lacked the expertise and knowledge to do so.

However, one site we studied, *Crutchfield.com*, was very different. Crutchfield's merchandise team didn't copy their product descriptions from the manufacturers'. Instead, their customer service staff wrote extensive descriptions of each product, answering the questions that shoppers had.

In our study, we noticed Crutchfield's production choice paid off. Although the average shopper spent 89 percent of the money we'd given them as a budget for their purchase, those shoppers spent 237 percent on the Crutchfield site.

In our study, all the sites sold essentially the same products. The only difference between the experience shoppers had on Crutchfield versus other ecommerce sites was the product description. It was the writing of the Crutchfield product descriptions that increased the value over what other sites could sell.

Crutchfield's writers anticipated their customers' needs. Customer service fed them the questions that customers had, giving them solid insight into how to craft the content. They could reduce future customer support calls by providing the information directly in their rich product descriptions. The writing not only increased purchases, it reduced support costs.

Technical Writing Then and Now

In the 1980s, technical writing was a thriving occupation. The sudden burst in personal technology gave rise to innovation, all of which required manuals and descriptions. While technology was personal, it was also complex. Technical writers were essential to providing value.

During that time, there was an old saying: you could get a major upgrade to your favorite software packages just by reading their manuals. Buried in the technical documentation were points of real value. Positions for manual authors were ever-present. Yet, by the end of the decade, things had started to shift.

The 1990s brought a sense that documentation needed to be delivered "just in time." The move pushed technical writing away from manuals and toward online user assistance, such as online tutorials and help.

In the 2000s, we saw a push toward more intuitive interfaces. These were hailed as not requiring any manuals or assistance. The user would know what to do just by what appeared on the screen.

By the 2010s, manuals had all but disappeared. Where a new device in the 1980s might have a 300-page manual, new devices (like a smart phone) in this new decade came with no documentation at all. Web and mobile apps didn't require any explanation. The interface told you exactly what to do. It seemed like technical writers were no longer necessary.

Yet, the Crutchfield and Significant Objects studies tell us that there's value that emerges from quality writing. Writing skills are necessary, but the role of the writer has changed dramatically.

The Gusto Effect

ADP, a company that has dominated the payroll processing market since it started in 1949, is now running scared. A new competitor has entered the market and is gaining market share quickly. That competitor is Gusto, a six-year-old payroll processing company that recently found itself valued at more than $4 billion dollars.

What makes Gusto such a threat is its self-service model. Through smart design, it reduces the need for human resources professionals to handle payroll, benefits, and other human resource needs. Instead, companies that employ Gusto can have their employees handle practically all requests and adjustments to their status.

Gusto makes these technical domains easy for employees to manage with a heavy investment in technical content. Yet, that investment doesn't happen with the 1980s approach to manuals or the 1990s approach to online user assistance.

Instead, Gusto uses a very modern approach by building the asssitance directly into the design. Prompts for information are made in plain English, not HR and tax authority jargon. As the user is prompted for information, additional assistance appears to the side. The result is a very clean and approachable design that doesn't overwhelm, given the underlying complexity of what the system needs to do.

Designing Intuitive Technical Communication

Product descriptions like Crutchfield's and designs like Gusto's need to accommodate their users' knowledge of the domain. In any design, there are two types of knowledge we need to understand: *current knowledge* and *target knowledge*.

Current knowledge is what our user knows the moment they approach our design. It's all the knowledge they've gleaned from dealing with similar things in the past. *Target knowledge* is all the knowledge necessary for them to accomplish their desired objective.

A design becomes intuitive for a user when current knowledge and target knowledge are so close that the user doesn't notice they're being trained. From their perspective, they walk up to the design and know exactly what to do.

We could make a design seem more intuitive by simplifying its interface. Reducing required target knowledge through design simplification eliminates any additional knowledge that the user needs to acquire to succeed. Do that enough and the user starts describing the interface as intuitive.

The historical role of technical communication has been to increase current knowledge until it matches target knowledge. We were training users on what they need to complete their task. In almost every case, that training was constrained to the mechanics of the design. A word processor's manual described its features, but rarely explained how to write well.

For complex domains, such as electronic product features or payroll information, current knowledge and target knowledge are no longer only about the design's features. To purchase the right product or set up the correct tax withholdings, the users need to know both how to use the features *and* how to make the right domain-related decisions.

Becoming Technical Communication Designers

Crutchfield and Gusto succeed because they anticipate the users' needs. The teams behind these designs clearly understand the value great technical communication delivers.

Yet, "Technical Writer" is not a role on these teams. Crutchfield's product descriptions were created by customer service representatives. They weren't hired as writers, but they clearly have strong writing skills. The same applies to the designers for Gusto.

Writers can deliver great value to design teams like those of Crutchfield and Gusto. However, you need to enhance your skill set to make the full contribution.

You need the skills of user research to help identify the needs of the users. You need to know how to best employ typography, layout, and color—the core skills of visual design—to communicate the key messages. You need to know how to best use interaction and animation to present and draw the user's attention.

Intuitive technical communication isn't only about crafting words; it's about knowing which words are necessary and how to present them.

For many writers, it might seem daunting to acquire these new design skills. It is certainly a bit of work to do so.

The good news? The effort pays off. By mastering the design skills necessary to augment your writing skills, you will become a part of the new generation of technical communicators and find yourself strongly contributing to the design. Like the writers in the Significant Objects project who dramatically increased the value of ordinary objects through effective writing, you will be creating business value through your expanded writing skills.

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Bringing Content and Design Together

to Make the Dream Team Happen

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How we are breaking the engineering, design, and content silos for a better experience for users.

By JENIFER SCHLOTFELDT and MISSY YARBROUGH

HOW TIMES HAVE CHANGED! Gone are the days when technical writers were thought of as copy editors, or someone who took a technical specification and made it understandable to the wider world. In today's technical writing world, we have automated content quality checking tools, and Jenifer can't remember the last time she documented a feature beginning with a specification. Our focus is increasingly not on books or other traditional deliverables, but on user interfaces.

New Names for Updated Roles

As our focus and skills change, so do our titles to more accurately represent the work we do. Instead of using the title "Information Developer," which is the IBM equivalent of the wider industry's "Technical Writer," Jenifer has asked her team to use the title "Content Designer." As content designers, we are looking at the *total* content experience. We define a content journey from marketing to the product to support information. We're ensuring that users can find the content, regardless of whether we are creating embedded assistance or leveraging SEO to discover a tutorial.

As such, content designers should be collaborating with many different departments in the company, including marketing, support, development, and design. While the other areas are necessary to a product's creation, it's the

design *collaboration* that is crucial to ensuring the best experience for the user.

At IBM, there are a few key roles that are involved in understanding and addressing user needs, including design researchers, user experience (UX) designers, front-end developers, and visual designers. While each role might appear to be distinct, they each implement their specialties in a highly collaborative manner for a tightly integrated outcome.

Cross-Discipline Collaborative Design

Faced with complex problems, the design process typically starts with simple beginnings: uncovering user challenges and understanding users' respective as-is scenarios. Serving as the direct connection to the pulse of our users, our design researchers dig deeply by using both quantitative and qualitative research methods. Their resulting research insights inform fellow product members of the users' interactions with the product.

Equipped with empathy and validated knowledge, UX designers conceive experiences and supply solutions that fulfill product requirements.

In tandem, front-end developers are brainstorming ways to make design concepts become real and practical for coding.

Throughout the process, our visual designers are responsible for creating lasting visual connections with our users while elevating the core essence of the product.

In our team, we work in squads that include members from development, design, offering management, and content departments.

As new features are committed to the development plan, design is first to take the lead. Being the compassionate touchpoint, our design researchers will get in direct contact with our users to understand how they consume the product and any resulting pain points or delights they have experienced. In conjunction with our analytics team, they also collect quantitative data that further validates user feedback.

Researchers connect with the UX designers to assess users' current landscape, taking into consideration the multitudes of context in which users might be engaging with the product. UX designers will then thoughtfully apply the findings by considering increments of improved experiences—future versions of the experience that are playfully referred to as the cupcake, birthday cake, and wedding cake stages. While conferring with development and offering management teams, the design team defines a design-centric roadmap containing priorities for the squad to agree upon.

Once we have alignment within the squad, the various disciplines diverge to produce deliverables that better the users' interactions and engagement with the product. Research distills additional feedback from users through wireframes and prototypes that visual and UX designers create. Meanwhile, front-end development bridges the lines of communication and collaboration with our respective back-end teams by assessing the technical viability of design concepts. Offering management continues to ensure that we are aligned with both business needs and user needs.

Content in the World of Collaborative Design

You might be wondering, "How does the content designer engage with this nebulous complexity of team interaction?" The key is finding the sweet spot during the process when content designers should fully engage. The designs need to be in a state where the changes are small, but not yet handed off to development to implement, so that content designers can have an impact.

How do content designers have an impact? In two ways:

1. **Terminology:** Collaborating with design researchers, content designers can identify terminology to be tested. What term is going to resonate best with your users? Terminology discussions tend to be very opinionated. User data can always break the opinionated tie.
2. **UI design:** When collaborating with both UX designers and front-end developers, content designers can provide content feedback on the user interface. For example, you might point out that if the UI can programmatically determine a value, then less documentation might be needed, because you won't need to explain to the users how to determine that value. Content designers might also impact the flow of a UI screen simply by sharing drafts of topics. Seeing how the task will be explained to a user can point out where the sequence might be off.

In the end, when we bring together design and content, the user experience benefits. Users aren't left abandoned during their content journey while learning to use the product, the user interface is easy to use, and the user is successful in accomplishing their goals.

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Graph Colors vs. the World:

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Exploring the Empty Valley between Data Visualization and Multicultural Communication

By JONAH SCHWARTZ | *STC Member*

Lost in Localization

Culturally appropriate colors are a necessity in all forms of documentation. Single-sourcing and structured authoring tools have enabled technical communicators to localize content, targeting information to different audiences simultaneously. However, there are circumstances where information cannot be localized.

Conferences and live presentations—specifically within multicultural international organizations (MIOs)—are spaces where information is received collectively, but interpreted and acted on through individual cultural lenses. In these spaces, we get one opportunity to deliver this information effectively. Data has buying power, regulates decision-making, and alters worldviews. Since color meaning varies greatly between cultures, graphical data has the potential to influence your audience in unintended ways if those colors conflict with their cultural values.

This article exposes a research gap between data visualization and intercultural communication, explains why this is a problem, and offers a surprisingly straightforward solution: graphical color context must be explained to ensure that data is interpreted correctly.

It Begins with the Style Guides

MIOs can range from the United Nations, the International Olympic Committee, and Doctors Without Borders to standards organizations, trade associations, and multinational businesses. Whether private or intergovernmental, MIOs are comprised of members from multiple countries, often relying on a single style guide to produce their documentation.

Table 1. Multicultural International Organizations (MIOs) and number of Member States (May 2017) showing the depth of cultural needs that must be addressed simultaneously in MIOs.

MIO	Member States
United Nations	193
INTERPOL	190
IEEE	160+*
Underwriters Laboratories	113
International Olympic Committee	95
International Astronomical Union	73
MSF/Doctors Without Borders	60+*
Commonwealth of Nations	52
3GPP	42+*
CERN	38+*
IUPAC	35
ITER	35
NATO	28
FERMILAB	23

**Precise number not provided by MIO*

In other words, layout and formatting rules are uniform and don't change based on where the author lives or where the document will be delivered. Many MIO style guides are unavailable to the public, thus impossible to evaluate. The others, however, vary greatly in the specificity and granularity of their rules. Some are loose and ambiguous, while others, like CERN, are rigid and exhaustive in spelling and formatting conventions.

Color was seldom mentioned in the style guides I investigated, but *none* of them stated *how* color should be used in image and graphical data, only whether it *should* or *can* be used. While there is no shortage of research on intercultural communication, international color perception and meaning, or effective graph design (particularly hue and intensity), there is limited research on whether, and how, data visualization colors affect multicultural users.

This leads to some compelling questions:

- **If not, why not?** Why would color be such a salient design element for images and text, but not graphs? If true, this discovery would change many documentation methodologies. I don't believe this is the case.
- **If so, what can be done about it?** This is my research question, and the one to which I offer a solution: we must explain and justify our color choices.
- And perhaps most troubling: **If you change the visualization colors, do you change how it's interpreted?** The research indicates that this is true.

Figure 1. What is the relationship between color, multicultural communication, and data visualization?

The rhetorical power of graph colors needs to be better understood. I am not referring to generally accepted design maxims, such as limiting colors and making them readable for black-and-white printing. The United Nation's style guide cautions writers to be conscientious of this, while IEEE's comes the closest when they say, "Color in figures shall not be required for proper interpretation of the information" (24). But this is ambiguous. A well-designed graph must be readable without explanation. A legend will tell you blue represents X and red represents Y—but what do blue and red communicate? When you present to an audience of mixed cultures and nationalities *simultaneously* (i.e., via conference, presentation, or broadcast/webcast), that answer will change depending on who is being asked.

Color Meaning Is Not Intuitive

Color meaning not only varies between cultures but between industries. John Brockmann states, "Green for process control engineers means 'nominal or safe,' for financial managers it means 'profitable,' and for healthcare workers it means 'infected'." (158).

In the United States, red and blue each have their own spectra of meaning, but when paired, new and often contradictory levels of utility are formed across a disparate range of fields and applications.

Table 2. Examples of industrial color coding of red and blue in the United States, showing critical, but disparate, variations in meaning. These are not international standards, thus color must be explained.

Application	Red	Blue
Blood collection tube	No additive	Sodium citrate
Chemistry model	Oxygen	Nitrogen
Compressed air cylinder	Flammable gas	Nitrous oxide
Electrical wiring	Line 1	Line 3
Fire diamond	Fire hazard	Health hazard
Fire hydrant	≤500 GPM	≥1500 GPM
HAZMAT warning label	Dangerous when wet	Flammable
Highway traffic sign	Regulatory information	Service information
Hospital emergency code	Fire	Cardiac arrest
Pavement reflector	Wrong way	Fire hydrant
Pipe marking	Fire quenching fluid	Compressed air
Railroad signal	Stop and proceed	Workers under train
Runway lighting	Runway ends	Taxiway
Utility lines	Electric	Potable water

We partition multiple color meanings simultaneously without difficulty—while acquiring new ones—because we understand these contexts either through experience or instruction. Color has no inherent value; there are no universal or neutral colors that effectively suit the needs of highly stratified audiences who may vary in skill and literacy levels. Thus, when information cannot be localized to suit audience needs, explaining colors aligns author intent with audience understanding.

We ascribe contextual meaning to colors, and only once intent is explained and agreed upon can we act appropriately and safely. Yet we don't do this with data visualizations. If someone charged with handling dangerous chemicals, landing an airplane, or interpreting a weather map is unfamiliar with the respective color usages, successful completion of the task cannot be guaranteed. Ameersing Luximon and his team identified varying interpretations of the threat-level of hazard color codes (red, orange, yellow) between Chinese and Western audiences, but not the associated words (warning, danger, caution). Whether interpretation would change based on which explanation is given—or their ideal wording—is an open question.

In 1998, IBM researchers Bernice Rogowitz and Lloyd Treinish wrote about communication failures in data visualization. They note "standard uses of color can distort the meaning of the underlying data and can lead the analyst to incorrect evaluations, conclusions, or decisions.… Creating visualizations… is typically ad hoc, and you often must spend many iterations to create the 'right' visualization." It's worth noting that they were speaking of content creators misleading themselves with inadequate color choices. This confusion would arguably be passed onto audiences.

MIO audiences would benefit from understanding author intent. Figure 2 reflects identical data interpreted by two parties. Similarly, Jan de Leeuw shows how a simple table signals emotions by mixing hierarchy with intensity level (Figure 3).

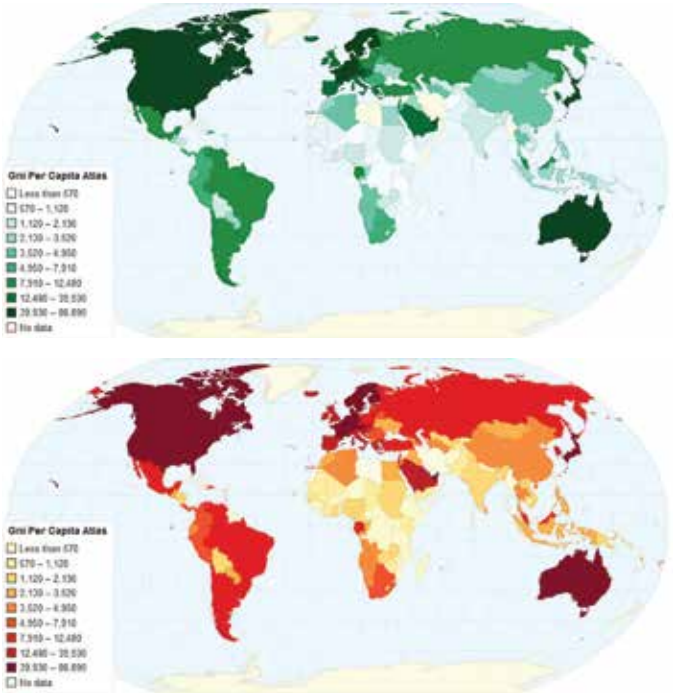

Figure 2. Identical data interpreted by two different parties.

Units sold	Mon	Tue	Wed	Thur	Fri	Sat
Week 10	100	290	220	200	240	220
Week 11	140	190	180	225	300	100
Week 12	80	160	210	230	140	250
Week 13	120	110	100	250	120	260

Units sold	Mon	Tue	Wed	Thur	Fri	Sat
Week 10	100	290	220	200	240	220
Week 11	140	190	180	225	300	100
Week 12	80	160	210	230	140	250
Week 13	120	110	100	250	120	260

Figure 3. A simple table can signal emotions by mixing color cues for hierarchy with color cues for intensity level.

These figures illustrate the relationship between data and color perception, but neither are inherently more aesthetic or effective than the other. While the comparisons are alarming, both can fulfill their goal if the audience understands the intended color meaning.

Explaining Color Choices Resolves Problems

There seem to be few reasoned color choices in charts, graphs, and data visualizations:

- Software defaults (no action taken)
- Organizational/sponsor colors
- High contrast colors to increase salience or visibility (perhaps chosen arbitrarily)
- Style guide specifications (None exist that I can find)
- Personal preference/favorite color (Never do this)
- To draw attention; to alarm or pacify (for example, red for danger; blue because it's relaxing)

The only individuals who know why these colors are chosen are the content creators. Nations in MIOs should consider clarifying their color choices, because all communicators, no matter where they are from, have the responsibility to ensure that their information is received as intended.

To be effective, graphs must be quickly and easily comprehended, without the viewer needing to be told how to read them. Unfortunately, this means misuse or misunderstanding of color could quickly affect how the data is perceived. As Figures 2 and 3 reveal, color informs meaning, and different emotions are evoked at a mere glance. It may seem counter-intuitive to explain color meaning if the graph is already readable, but Table 2 shows that we already explain color meanings in myriad contexts. Diversified audiences have to suspend their cultural association of these colors to correctly or effectively interpret the data.

Palette generators that reflect a specific multicultural audience's color associations are helpful tools, but in these, as well, there is no clean or universal color scheme in spite of context and purpose. Much like numerical data, colors can mislead or confuse, thus identifying author intent would relieve audiences of relying on their own interpretations. Visualizations designed with best practices still communicate color meaning that exists independent of the data. However, stating, for example, "color represents deforestation rate" may confuse audiences if that color is associated with growth.

If content creators are as conscientious about the cultural impact of our color choices as we are in other areas of documentation, data can be interpreted more precisely.

How to Prepare Graphical Color Explanations

Explanations must not interfere with graph readability, should only explain color purpose (not the data itself), and should be footnoted, as is common in many visualizations. As there are few reliable reasons for specific color choices, MIOs could amend their style guides to provide instruction on how to write an explanation for each situation. Clarifying intent (for example, "colors use software defaults" or "color represents organizational colors") is salient, because it is objective and disconnected from emotion.

How instructions are written, the colors they use, and the language in which they're written will vary by organization and situation, but that shouldn't be a problem if the explanations are clear and concise.

Documents—and these descriptions—should be translated as needed, but if data colors are localized (or changed) too, multiple versions with varying colors risks confusing audiences.

Applications Beyond Conferences and Presentations

East Carolina University Professor Dr. Michael Albers' document design assignments call for justification papers that use research to defend and justify choices of typeface, image placement, color, and so forth. I've asked other technical communicators if they exert this kind of thoughtfulness in their own work, and the predominant answer is "no." If we better understand our own design choices, then meaning will be clearer to our audiences. That meaning should be explicitly stated.

This approach has practical and commercial applications including:

- Health/medical literacy in patient documentation and imaging (especially if colors can be conflated with sickness or wellbeing)
- Internationally targeted news, science, and educational content distributed via print, Web, television, and social media (for example, YouTube, CNN International)
- Travel guides, which can further explain traffic signs, pavement markings, emergency signals, and most thoughtfully the color values of that country
- Historical research, to understand heraldic and geopolitical designs
- Wayfinding in complex and culturally diverse locations
- International conferences
- International airports
- International sporting venues (for example, World Cup, Olympic Stadium)

Josephine Caricato reports her findings on using color in live presentations. While she was not talking about data design specifically, she notes, "If cultures map colors differently, knowledge of color distinction will help a visual designer (a) reduce reaction time, (b) decrease message distortion, and (c) defer opposition within an audience" (505). Jo Mackiewicz's research shows how graph color attractiveness varies between Eastern and Western audiences, but notes more research is needed on color interpretations, especially when text is added to images, much like Ameersing did. These explanations are a good start.

Visual information communicates a narrative that can willfully or unknowingly manipulate an audience's emotions. When communicating to highly diversified audiences, graphical color choices must be clarified if we wish for them to be effective and interpreted as intended. It is incumbent upon us to ensure the intent of our data is imparted just as clearly as the data itself. I invite you to test this in your own workplace. Bring richer meaning to your multicultural-international users, and let us show how effective these explanations are.

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SOFTWARE REVIEW:

Building a Low-Fidelity Prototype with Justinmind

By MICHAEL OPSTEEGH | *STC Senior Member*

ONE OF THE FOUNDATIONS of an effective usability test is selecting the right tools. All of your careful planning, participant selection, and test development can be undone if your prototype fails during testing. A malfunctioning prototype may cause test participants to be confused, question whether they completed a task, or spend valuable test time remarking on the limitations of the prototype. Any of these situations can skew key metrics, such as memorability, learnability, perception of errors, and satisfaction, and can ultimately distort your test results.

There are, of course, many ways to mitigate a prototype failure, like beta testing or falling back on paper prototypes, but selecting the right tool for developing your prototype is the best first step. The Justinmind Prototyper (*www.justinmind.com*) provides a flexible platform for developing interactive, low-fidelity prototypes for your usability tests. Justinmind, however, has some limitations, so it may not be suitable for all of your projects.

About Justinmind

The Justinmind Prototyper allows you to develop functional wireframes for websites, desktop programs, and mobile apps. Simply drag controls, text boxes, and other elements onto the canvas, and add an action, a calculation, or other functionality (see Figure 1).

The primary focus of Justinmind seems to be collaboration between UX designers and developers, rather than usability research. The built-in tools are designed to enable you to share your prototype with stakeholders and solicit feedback through comments. Having said that, Justinmind makes concessions for usability testing by integrating with such third-party services as Validately, UsabilityTest, and Google Analytics (see Figure 2). To connect your project to these services, you'll need to share your project in the Justinmind application, and then go to your Justinmind online account, locate your project, and select the Usability Testing Tools option from the Action drop-down.

Figure 2. Online sharing enables you to connect to usability testing tools.

Although Justinmind offers the ability to connect to these usability testing services, the limitations in the actual

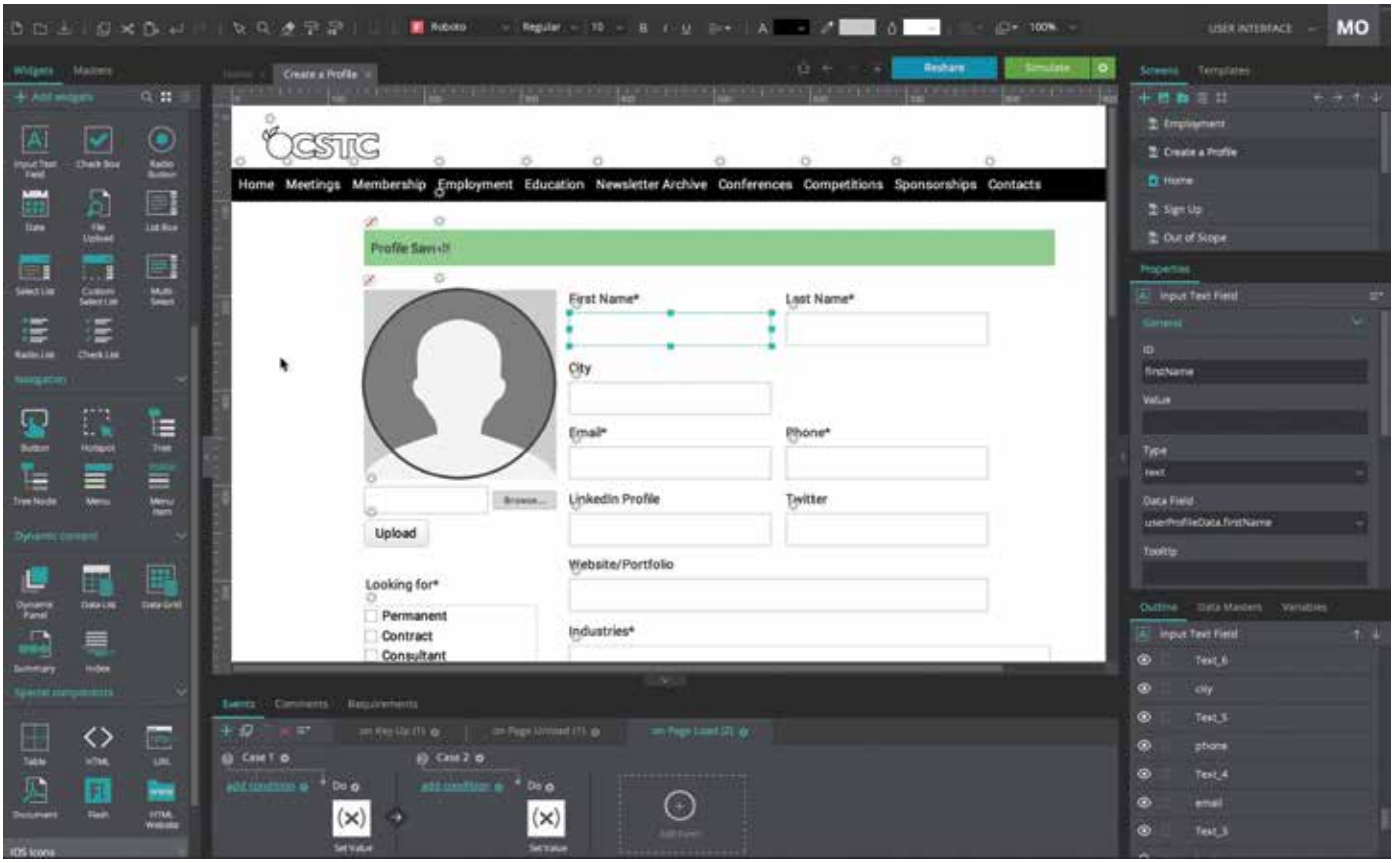

Figure 1. Justinmind Prototyper drag-and-drop interface.

prototypes make it clear that the real intent of the software is to create light-weight, proof-of-concept prototypes for presentations where the user input is predictable.

What's Great about Justinmind

Justinmind's drag-and-drop interface enables you to quickly drop interface elements, called widgets, onto the canvas to create a wireframe in minutes. The robust library of interface elements means you won't spend a lot of time developing your own from scratch. If you need to add interactivity, drag actions to elements on the canvas to make those elements functional. Additionally, Justinmind makes it easy to create a small database for use with your prototype.

Drag-and-Drop Interface Elements and Actions

Build a prototype quickly by dragging interface elements from the widget library to the canvas. Need a link to take the user to another page in the site? Simply drag that page to the menu or button, and the navigation action is created (see Figure 3).

Widgets and Interface Elements

Justinmind has a robust library of interface controls, or widgets, right out of the box. The basic library includes a vast array of text boxes and buttons and more advanced controls, like a file-upload element and a date picker. You can build navigation menus, navigation trees, radio lists, and more. If you're developing a mobile app, you can download additional widget libraries for controls specific to iOS and Android interfaces.

Dynamic Content

Your interface isn't going to be much use for testing if your participants don't have any data to work with. Justinmind's Data Master feature enables you to create a small database for your users to interact with. This is a handy feature for test scenarios that require looking up, creating, or editing data records (see Figure 4).

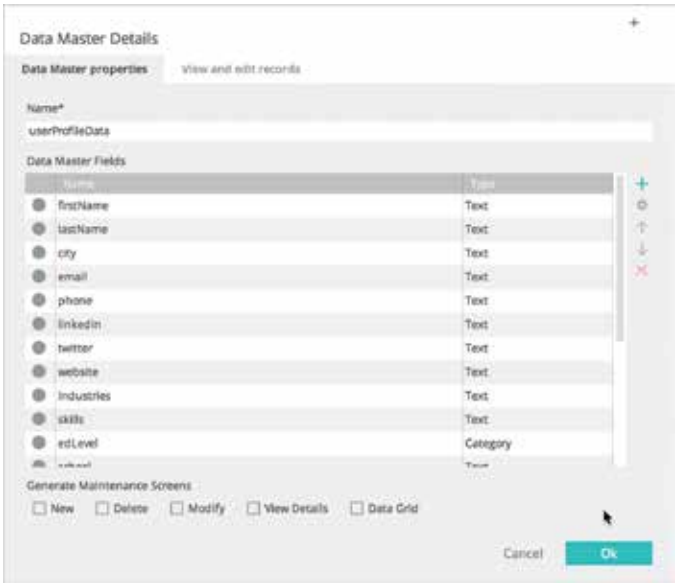

Figure 4. Justinmind enables you to create a small database so participants can interact with data in the prototype.

Want to create a form quickly? Drag your completed data master to the canvas, and Justinmind will create the

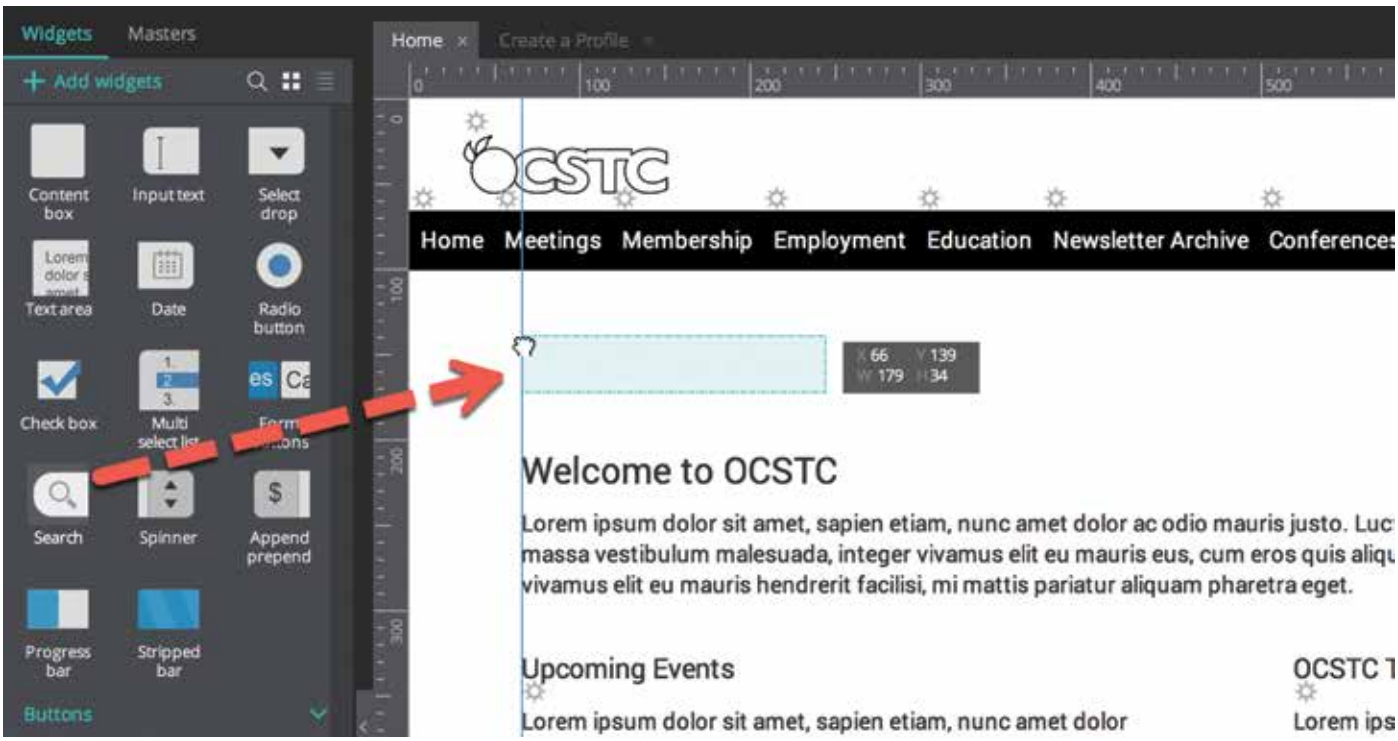

Figure 3. Drag items from the library to place them on the canvas. In this case, the Search element is dropped onto the canvas.

form for you. If you have an existing form, drag elements from the Data Master list to the fields in your interface to connect the fields to the database.

If you have a small amount of data for users to enter, you might dispense with the Data Master and use the Variable feature instead. Variables ensure that data entered on one page will appear on another page. However, this is only feasible if your user will interact with only one record and not have to add, modify, or delete any records. For example, users editing a personal profile page would only edit their own data, so this situation could rely on variables.

What Could Be Better

While Justinmind makes it easy to build an interface and add basic actions and data elements quickly, some basic functions aren't easy to program, some controls don't behave as expected, and there are unknown limits to the data that can be entered.

Tab Order

Justinmind's Prototyper doesn't give you the ability to set the tab order globally or on a page by page basis. By this I mean that you can't click the fields to set the order in which the fields come into focus as the user presses the Tab key. In fact, by default, pressing the Tab key in the simulation does nothing. This is striking, because tabbing through forms is a common action among users. To enable the Tab key to move the focus from field to field, you must add an action to each field individually—a time-consuming process for long forms (see Figure 5).

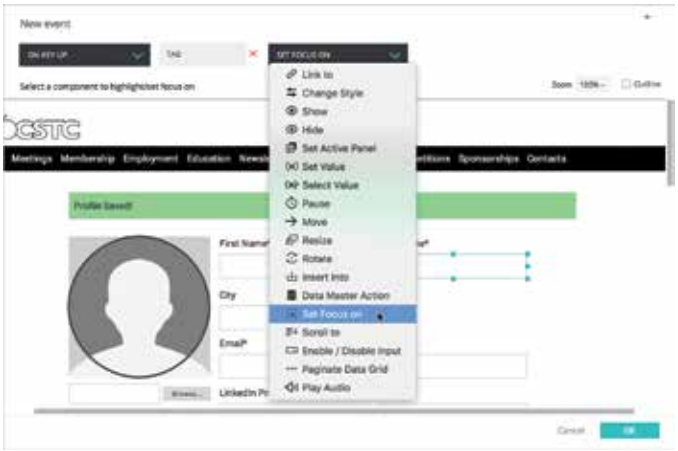

Figure 5. You must add an action to each field and select where you want to set the focus when the user presses the Tab key.

Controls Don't Always Play Nice with Data

Text variables retain the information entered in text boxes; however, selection controls, like drop-down menus, radio lists, check lists, and list boxes don't retain their selections by default. This is problematic when your test scenarios include tasks that require the user to return to the form to edit their data. You can add some complicated actions to some of the controls so they display the user's selections when the page loads again, but some controls, like the drop-down menu, don't seem to respond to these actions. These situations tend to cause confusion among participants ("Hmmm. I thought I selected that,"), which indicates that they might feel they did something wrong.

Unknown or Unexplained Limitations

The Justinmind Prototyper seems to enforce some undocumented limitations on data entry. The text area box does not wrap text to the next line when participants reach the width of the text frame. Instead, participants see only one long line of text. The text area box also does not accept more than 255 characters. This is a concern during the testing, because participants comment on not being able to enter additional data. This limitation, which reminds participants that they are working only in a prototype, seems to disengage the participants momentarily from the task at hand and lowers their satisfaction with the prototype.

Conclusions and Recommendations

A friend recommended Justinmind Prototyper to me recently when I mentioned that I was building a "paper" prototype using hidden layers and form fields in Adobe Acrobat. On his recommendation, I signed up for a 30-day trial and downloaded the software. I'm glad that I did. Even after taking the time to learn this new software, I believe I built the working prototype much more quickly—and with a better result—than I would have by repurposing a familiar tool to build it.

Having said that, the shortcomings mentioned in this article all arose during my usability testing. These quirks in the prototype caused user confusion and required the evaluator to intervene and explain that these issues were limitations in the prototype. These issues took the users' focus away from the tasks and drew their attention to the prototype itself, likely causing some variation in the click-rate and time-on-task data collected. The errors heightened users' perceptions of errors in the product and lowered overall satisfaction.

I recommend the Justinmind Prototyper for usability tests where participants will interact with limited amounts of data. Justinmind will help you to develop a highly interactive, data-driven prototype quickly; however, you'll need to beta test your prototype rigorously prior to conducting your evaluation.

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Registration for the 66th Annual Technical Communication Summit & Expo Is Now Open

If you are paying attention to the massive global shifts affecting us as organizations and individuals, not only do we need to meet, we need to attend meetings that provoke thought, define forward-thinking, actionable learning, and provide a toolkit for participants to move ahead in ways which will positively affect business outcomes.

—Tahira Endean

Join STC and fellow colleagues at the 2019 Summit, the premier conference for technical communication education and networking, 4–8 May at the Hyatt Regency in Denver, CO!

Registration for this can't-miss event is now open, and STC is offering a special early registration rate of **only $925 for STC members, a $800+ savings** from the full rate! Your conference registration includes the Welcome Reception on Sunday, continental breakfast on Monday and Tuesday, the Honors Reception on Tuesday, refreshment breaks, access to unparalleled education sessions, and information on the latest industry tools and technologies.

STC is also pleased to announce its Opening Keynote Speaker: Peter Morville!

More exciting news and speakers will be announced in the coming months. So what are you waiting for? Register today! See you in Denver!

Call for Applications: Community Achievement and Pacesetter Awards

IT IS TIME to begin gathering materials for two important community awards: the Community Achievement Award and the Community Pacesetter Award. Be sure to take some time to fill out each application so STC members can see how your community shines. Also, look for an upcoming webinar from the Community Affairs Committee later this year on the award applications and processes. ***Note that communities may apply for both awards.***

Community Achievement Award

The Community Achievement Award (CAA) recognizes a SIG or a professional or student chapter's outstanding accomplishments in achieving the Society's goals through a wide range of programs and activities. All communities are encouraged to apply. The CAA process determines the prestigious Community of the Year award. **Nominations are due 28 January 2019.**

Download the application and guidelines at *https://www.stc.org/community-achievement-awards/*

Community Pacesetter Award

STC's Community Pacesetter Award recognizes innovative and successful community initiatives. Unlike STC's other Community Achievement awards, which recognize communities for consistent strength in many varied activities, the Pacesetter Award recognizes the successful implementation of a single beneficial innovation that may be implemented by other STC communities. **Applications are due 25 February 2019.**

Download the application and guidelines at *https://www.stc.org/community-pacesetter-awards/*

If you have any questions about the application process, please contact Timothy Esposito, Community Achievement Award Committee Chair at *tmesposit@gmail.com.*

In Memoriam: Edward J. Carbrey

STC NOTES WITH SADNESS the passing of Edward J. Carbrey at age 94. Ed died on 5 October 2018 in Beverly, Massachusetts.

Ed was a well-respected member of the technical communication profession. He was a Fellow of the Society and served as STC Treasurer. He was very active in the Boston (later New England) Chapter, serving as Deputy General Manager and Deputy Program Manager for the 1982 International Technical Communication Conference in Boston, and later in the local publications competition. The Edward J. Carbrey Jr. Scholarship, established in 1996 and awarded to deserving undergraduate students in technical communication programs, was created by the chapter as a tribute to Ed. In recent years it became the Landers/Carbrey Spirit of Volunteerism Award.

Ed proudly served his country during WWII as a Sergeant in the United States Army and Royal Airforce. He worked at General Electric and the Massachusetts Institute of Technology as Publications Section Chief, where he lectured on "Communicating Technical Information."

He is survived by his wife, two sons, a daughter, a stepson, and two stepdaughters; his sister; 12 grandchildren; and many great-grandchildren.

Ethical Editing: A Case Study in Avoiding Predatory Publishers

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BY BRANDON C. STRUBBERG |
Guest Columnist and STC Member

IN EARLY 2017, a scientist from a prominent institution privately contracted me to edit a biomedical manuscript that he was writing for an invited submission. He was preparing to enter the academic job market later in the year, and the invited submission came as a welcome surprise. At the time, I was a new scientific editor in an editorial department at a cancer center in Texas. I followed my editorial training and requested details about the journal to review its author guidelines and recent issues. At the time, I didn't realize the prevalence of predatory publications within academic publishing. But after researching the journal, a publication by SM Journals (or the SM Group), I began to suspect that it was predatory. In this case study, I review how I identified a predatory journal and persuaded my client to avoid publication. I also offer fellow editors tips on how to do the same in a publishing environment filled with predatory publishers.

Exploiting the Open-Access Movement

I was a new scientific editor at the time of this case and was not aware of the sheer scope of the predatory publishing problem. In a study of 2014 scholarly publishing practices, Shen and Björk found that 8,000 active predatory journals, controlled by approximately 2,000 predatory publishers, published 420,000 articles. No, that is not a typo: Four hundred twenty thousand! The volume is up significantly from 2010, when *only* 53,000 articles were published. According to Gina Kolata in the *New York Times*, the number of predatory journals now tops 10,000—about equal to the number of legitimate journals, if not higher.

How did the world of academic publishing become inundated with predatory journals? Predatory publishing has arisen as an unfortunate consequence of the open-access publishing movement. In some fields, especially those in STEM, authors may pay to publish their research in journals that are freely available for anyone to read. Sometimes these fees can be quite high—even in the thousands of dollars, as is the case with the respected Public Library of Science (PLoS) journals. Predatory publishers seemingly emulate this model, but instead pursue academics via email canvassing, accept articles with little or no peer review, and then charge authors fees to publish their work. Authors are often notified of the fees only after the publishers have received the manuscript. If the author does not pay the fee, then the manuscript may be "held hostage" by the publisher.

Predatory publishers exploit a system in which publications are the cultural capital with which promotions are secured. Quite simply, academics who need publications create a demand, and predatory publishers supply easy access to venues for publication.

This column features ethics scenarios and issues that may affect technical communicators in the many aspects of their jobs. If you have a possible solution to a scenario, your own case, or feedback in general, please contact column editor Russell Willerton at *russell.willerton@gmail.com.*

Spotting the Red Flags

During my research into the journal my client had targeted, I encountered initial red flags on its website:

- The author guidelines page contained obvious grammatical mistakes.
- The website did not have active links to pages for a "Current Issue" or "Archive."
- The "In Press" link led to a page with articles published two years earlier.

Although these issues piqued my interest, I remained unconvinced that the journal was predatory—until I searched my client's topic using the site's search bar. At that point, I found an article authored by my client in one of the issues of the journal. The article seemed to be the same topic as the article I was editing and included the same coauthors; moreover, the article was riddled with mistakes. I next found my client's name on the journal's editorial board. My client told me that he had been invited to submit an article to the journal but had not mentioned serving on the editorial board, even when I asked him for more information about the journal. At this point, I was convinced that the journal was predatory, and my only remaining concern was communicating this information to my client, who could have been a willing participant as easily as a victim.

Confirming My Suspicions

To confirm the journal's predatory nature, I consulted Jeffrey Beall's website about predatory journals, *Scholarly Open Access*. Beall, previously an academic librarian at the University of Colorado Denver, coined the term "predatory publisher" in 2010. His website included a list of predatory publishers titled "Potential, Possible, or Probable Predatory Scholarly Open-Access Publishers," which was commonly called "Beall's list." Beall's list was well known and respected among scientific editors, so much so that it was a spoken rule within my department to consult the list any time an unknown journal came across one of our desks. For years, Beall's list was one of the few pockets of strong resistance against predatory publishers, though there have been many pranks against predatory journals that routinely call attention to their unscrupulous actions (see Bohannon 2015; McCool 2017; and Sorokowski et al. 2017).

Beall's list included SM Journals—the publishers seeking my client's article—as predatory. Beall himself had even written a post about SM Journals. The post included an email from the group inviting a researcher to propose a topic and guest-edit an issue. Beall also discussed the journal's suspect address, a P.O. Box in Delaware owned by a law firm that specializes in providing U.S. mail stops for foreign businesses. Beall (2016) concluded, "Medical research is way too important to trust to bogus publishers such as SM Group. It's a completely deceptive and exploitative publisher that all researchers should completely avoid."

Addressing the Client

With my findings in hand, I wrote a detailed email to my client. Because I was not sure if he was a victim or participant, I wrote an email meant to educate, commiserate, and warn. My message began by stating my concern about the journal. I described the journal and linked to its website with a description of the issues I found, including my client's name and paper. I then listed some statistics about predatory publications and lamented the ease with which even seasoned scholars could be fooled by these journals' tactics. I also included links to Beall's list and his post about the SM Group, along with a link to another article about SM Journals written by a high-profile researcher. Finally, I told my client that I felt an ethical obligation as an editor to present this information and urged him to reconsider publishing with this particular journal and publisher, lest his reputation be called into question in the future. I offered to refund the down payment he made for editing services.

My client then performed his own research and agreed with me that the journal was predatory. He assured me that his name had been listed on the editorial board without his consent. Likewise, the paper already published was an earlier draft of the very paper that he contracted me to edit. He had not been told that the journal published the early draft of the paper. He also thanked me for alerting him.

While he worked to have his paper and name removed from the journal, he had me continue editing his manuscript, which he eventually published elsewhere in a legitimate journal.

I initially worried that he might be put off by my warning about the journal. Doing the right thing, however, paid off for both of us; we have worked together several times since.

Putting Predatory Publishers on Notice

In recent years, predatory publishers have come under greater scrutiny. In 2016, the Federal Trade Commission (FTC) moved to bring a suit against the OMICS Group, a publisher of many scientific journals that has been criticized for unscrupulous business practices and misleading marketing tactics, including promising authors thorough peer review, deceptively concealing pricing practices, and falsely listing well-known scholars on the editorial boards of their various journals. And in 2017, the FTC won a preliminary injunction against the OMICS Group that requires the conglomeration to disclose all costs related to submitting and publishing academic articles in their journals and prohibits them from misrepresenting their publishing practices to the public.

Losing Beall's List

Unfortunately, Jeffrey Beall shut down his site in mid-January 2017, quite literally days after I consulted it, after years of receiving threats

from predatory publishers. There are conflicting reports regarding why Beall took down his site, ranging from personal decisions to pressure from his employer. With Beall's list gone, authors and editors alike lost their single most comprehensive list of predatory publishers, making it even more difficult to stymie the rising tide of predatory publications.

Editing Ethically

Scientific editors have an ethical obligation to protect their authors and, indirectly, the public from predatory publishing practices. Although the FTC stepped in to stop OMICS and put other predatory publishers on notice, the business is simply too lucrative to abandon. And the FTC cares only that business practices are transparent and not deceptive. Their focus is not on the danger to the dynamics of constructing scientific knowledge. With 420,000 articles published by predatory journals in 2014 alone, there is a very real danger of unchecked science building upon the unchecked science that came before it—or even good science wasting away in a predatory publication.

In an age when experts are under siege, fake news accusations fly freely, and willful ignorance is seemingly celebrated, we need to do what we can to protect scientific communication, and it starts with our serving as gatekeepers to our authors. Doing so fulfills the principles that govern our membership with STC, opposes unethical publishing practices, and prevents unvetted science from making it out into the world.

Identifying Predatory Journals

When helping clients avoid predatory journals, editors should always do their due diligence and ask authors for information about target publications. This initial step is especially important for editors who perform substantive or "scientific" edits for authors, but it is a good practice for editors who may be copyediting or proofreading as well. The manuscripts we edit, no matter the level of the edit, reflect our professional values. Additionally, identifying a predatory publication and warning an author can generate much goodwill and improve the professional relationship between author and editor. Most importantly, it is simply the right thing to do.

Start by researching the journal online. Explore the homepage and read the mission statement and scope to determine if the author's paper fits; read the author guidelines. Keep an eye out for the following red flags (for a more comprehensive list, see Shamseer et al.) throughout a journal's website that may indicate the journal is predatory.

- Obvious spelling and grammar mistakes.
- A broad scope within or beyond the discipline.
- Images with poor resolution.
- Unclear or nondescript manuscript processing and peer review procedures.
- A promise of rapid publication.
- Poor, unclear instructions for authors.
- Few publications within the previous two years.
- An address tied to a law firm or business other than the publication.

Any one—or even all—of these characteristics will not guarantee that a journal is predatory. Open-access publishing enables anyone to start a journal, and poor editorial work could simply be an indication of a new journal with a small or overworked staff. That said, you should absolutely be suspicious if you see any of these problems.

Consult lists to help verify if a journal is suspicious. Beall's list can still be accessed via Internet archives, such as the Wayback Machine, though he has not updated his list since January 2017. Comprehensive lists of predatory publishers freely available are difficult to find, but Cabell's International, a Texas company that specializes in scholarly analytics, maintains lists of both legitimate publishers and predatory publishers as a part of a subscription service. Additionally, the *Directory of Open Access Journals* lists only journals from publishers that have met a specific set of criteria for inclusion. Finally, a group of anonymous researchers (see Stop Predatory Journals) occasionally adds to Beall's list, which they have reproduced from the Internet archive, but not with the same dedication or frequency that Beall himself previously did.

Persuading Authors

The final step for many editors will be persuading the authors with whom they are working to also recognize that a journal is predatory and avoid publication in it. Although such avoidance may seem like common sense, keep in mind the pressure under which many researchers work. To obtain research jobs and promotions, especially in STEM fields, most researchers are evaluated heavily by the number of publications they produce. For many authors, any publication is worth pursuing, which leads to the most disheartening aspect of the recent rise in predatory publishing: Some academics seem to be willing participants. Kolata states, "it's increasingly clear that many academics know exactly what they're getting into, which explains why these journals have proliferated despite wide criticism." In a recent study, Derek Pyne, Professor of Economics at Thompson Rivers University, studied his colleagues' publications, finding that those who received promotions had at least four papers published in suspicious journals. He found that there was no downside at his institution to publishing in predatory journals, and, in fact, it may be beneficial to do so if promotion committees provide little oversight.

Although small studies, such as Pyne's (2017), show no negative effects at his institution for researchers who publish in predatory journals, other institutions have begun to scrutinize the publications on job applicants' CVs far more than they have done

in the past (Kolata 2017). And some critics have placed responsibility, at least partly, with the home institutions of the researchers who publish in predatory publications. Institutions and grant-awarding agencies care about where their names appear, as well as the reach of the research attributed to them. Many of these predatory publishers are not properly indexed or tracked beyond Google. Complicit scholars' names, and their work, may not appear in tracking statistics for citation purposes or appear in major databases (though, of course, the journals claim they are properly indexed). Whether the author with whom we work is a willing participant, willfully ignorant, or a victim, we need to use our knowledge of the industry—and our rhetorical chops—to attempt to make a difference.

First, approach this issue as an opportunity to build goodwill with the author. Do not accuse or imply the author of willing participation. I recommend taking a comprehensive rhetorical approach—similar to the one I took with my client—that makes use of Aristotle's three appeals: logos, ethos, and pathos.

Educate authors by:

- providing statistics about the sheer volume of predatory publishers;
- describing the tactics they use to ensnare authors; and
- quoting and linking to expert sources.

Warn authors that their credibility could be compromised by:

- describing the potential damage to reputations, and
- describing the potential effects such publications could have on job or promotion prospects.

Remind authors that their work has social implications by:

- describing the potential negative effects of published science that has not been peer reviewed, and
- discussing how the stakes go beyond the academy and can affect laypeople who may act on unconfirmed science.

Taking a well-rounded approach covers all possible ways in which the author may be involved with the journal and makes a variety of appeals designed to persuade authors to reconsider publishing in a predatory publication.

Conclusion

Predatory publishing is a rampant problem within the academic publishing industry, especially in science and medicine. Even with some resistance out there, it is a practice that will likely compound in the near future. Many researchers are not educated about how to identify and avoid such publications, and the pressure to publish can lead some to leap unwisely. Editors can and should play an important role in this regard by helping authors understand the magnitude of the problem and keep them away from such publications. We have an ethical obligation to do so, for the sake of our clients and the advancement of scientific knowledge itself. 1

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Brandon earned his PhD in Technical Communication and Rhetoric from Texas Tech University, where he also served as the STC Student Chapter President from 2013–2015. *Thanks to Kristina Lewis, Brian Blackburne, and Russell Willerton for help with this article.* *Brandon is on Twitter via* @bcstrubberg.

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Cognition, Chunking, and Design

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BY KIRK ST.AMANT | *STC Fellow*

OUR BRAIN IS an amazing computer. Like all computers, our brains also have limitations affecting how much data they can process at once. This factor is called *cognitive load*, and it has implications for usability and design.

Memory and Capacity

Short-term memory is central to cognitive load. When processing input, our minds hold new information in short-term memory to:

- Identify it (for example, this is a can opener)
- Determine what to do with it (use to open cans)

If we limit the information held in short-term memory, we can efficiently identify and use items.

There is one problem: our short-term memory can only hold a limited amount of input (7 +/- 2 units of information) at one time. Yet, we continually take in massive amounts of data; why are we not overloading our minds? The answer involves how we combine smaller bits of information into larger units—or "chunks"—for processing.

Chunking and Processing

When you look at a keyboard, you don't view it as individual keys, letters, and the housing holding the keys together. Rather, your mind perceives all these items as combined into one "chunk," or unit, for processing—"a keyboard." This chunking approach limits the overall units of information we need to hold in short-term memory at any time and allows us to process relatively effectively through most day-to-day situations.

This chunking of information is also scalable. It can occur with small items—such as viewing keys and housing as a single keyboard. It also can be extended to how we perceive overall contexts—such as viewing the keyboard as an element in the overall informational chunk associated with "office." What we focus on when chunking information depends on our objective (e.g., "use the keyboard to…" vs. "go to the office to…") and on our prior experiences.

Exposure and Expectations

How we organize sensory input is not random. Rather, our experiences teach us to chunk smaller components into larger, comprehensive units of information. The more we encounter a keyboard as a collection of keys housed in a container, the more we learn to combine those elements into one unit for processing. The more we encounter keyboards in office spaces, the more keyboards become part of the chunk we associate with "office." Over time, these experiences shape how our minds identify input to readily organize sensory data into well-established units for consideration. They are also central to how we can pack large amounts of information into our short-term memories for quick and effective processing.

This is why we often feel overwhelmed in new situations. When we have no pre-existing model for chunking sensory input, we need to review the individual items we encounter to determine what they are and how they work together to achieve objectives. Doing so quickly fills short-term memory and can result in feelings of information overload—too much information to process at one time. Cues that help us chunk the data we encounter, however, can help us better navigate new contexts and use the materials in them. It is this relationship that is key to usability and design.

Design and Usability

Making new information usable involves helping individuals organize it into identifiable units. Strategies to for achieving this objective include the following.

Parallel chunking: This approach involves using prior experiences to guide the chunking of new information. If we design new items to resemble existing ones, we can help users organize sensory information

This column examines how cognitive factors can affect technical communication and design processes. Email the editor at *stamantk@ecu.edu*.

quickly and more readily recognize and use things. This is because our minds can use existing frameworks to organize new input into chunks. An example is designing the toolbar of a new word processing program to resemble that of existing programs to help users identify and use features instead of struggling to make sense of a completely new design.

Identifiable chunking: This strategy relates to designing a completely new item. In this case, individuals cannot replicate an existing design. Rather, they need to create something completely new. In such situations, usability involves designing in a way that chunks new information into a limited number of easy-to-identify units. This can be done by:

- Restricting the distinct features of the design (e.g., seven or fewer menu options on an interface).
- Labeling each feature accordingly (e.g., using "Italicize Text" to note this specific font feature).

In these instances, the key to usability is to avoid assuming new items inherently indicate what they are and what they do. Rather, a product developer must account for *both* when creating new designs (for example, use both text *and* images to identify different software features or functions). Doing so provides the user with a ready-made system for chunking new information into units that short-term memory can easily identify and process.

Final Thoughts

Usability is often a matter of how our minds perceive and process information. By understanding how short-term memory works, we can create materials that are easier to use. Designs that chunk information effectively can contribute to the usability of materials. Technical communicators can use certain strategies to apply these ideas in ways that make meaningful contributions throughout the product design and development processes.

Structured Creativity

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BY ALAN J. PORTER | *STC Senior Member*

WHEN IT COMES to content design, I believe, as in many other areas, that there is a lot technical communicators can learn from the folks in marketing. Marketing is, after all, about capturing and engaging someone's attention.

Shouldn't well-designed technical communication do the same? Our goal is to help people understand and use our products, systems, and services, and to do that effectively we need our audience to be engaged and receptive to what we are communicating. So it's about time that we understood how to use imagery, color, storytelling, and even calls-to-action that drive the consumers of our content from one activity to another.

Conversely, I see more and more marketing organizations looking at what they can learn from technical communication when it comes to producing modular content and designing the metadata to drive new, personalized customer experiences—especially where the line between pre- and post-sales content is blurring. Many marketing organizations realize that to achieve a personalized, high-quality experience across a growing number of delivery channels, they need to plan the types of content they will need and how it will be designed and engineered to achieve those goals.

The areas of modular content design that are gaining particular traction are:

- **Content Modelling**: To represent of types of content, their elements, attributes, and their interdependent relationships.
- **Metadata**: To help applications, authors, systems, and robots use and relate the content in a smart way.
- **Mark-Up**: To identify the content outside of the content itself, it describes and presents content and can include XML, Markdown, and content transformations.
- **Schema**: To provide meaning and relationships to content. Schema often involves published standard vocabularies for describing concepts with standardized terms.
- **Taxonomy**: To create maps of related concepts which are applied to content, often as tags. Taxonomy enables and supports features like related content reuse, navigation, search, and personalization.
- **Topology**: To develop organizational structures and containers that provide coherence across content management and publishing systems.

But there is a stumbling block: while many marketing teams see the benefits of taking a modular approach to content design at a conceptual level, it is often also accompanied by a refrain of "it will destroy our creativity."

In fact, the opposite is true, for having a good modular content design framework can enhance creativity. It can help move a marketing organization from creating pixel-perfect one-off assets for every campaign that can't be reused, to thinking about how they can use that design expertise to deliver compelling experiences at scale to a wider variety of customers.

When the marketing and technical communication teams speak the same language around content design and structure, we all become more empowered to be creative as teams work together within a common plan. Content is designed and developed against common goals and standards. The work is better connected across the enterprise and is aimed at delivering the best customer interactions—no matter how and where those customers are connecting with the content.

As pre-sales content and post-sales content begin to overlap, Alan Porter provides the latest insights about our role in that evolution in Convergence Conversations. Learn through this column to build bridges and form synergies with your counterparts in marketing. Contact Alan at *ajp@4jsgroup.com* to ask a question or propose a topic for him to cover in this column.

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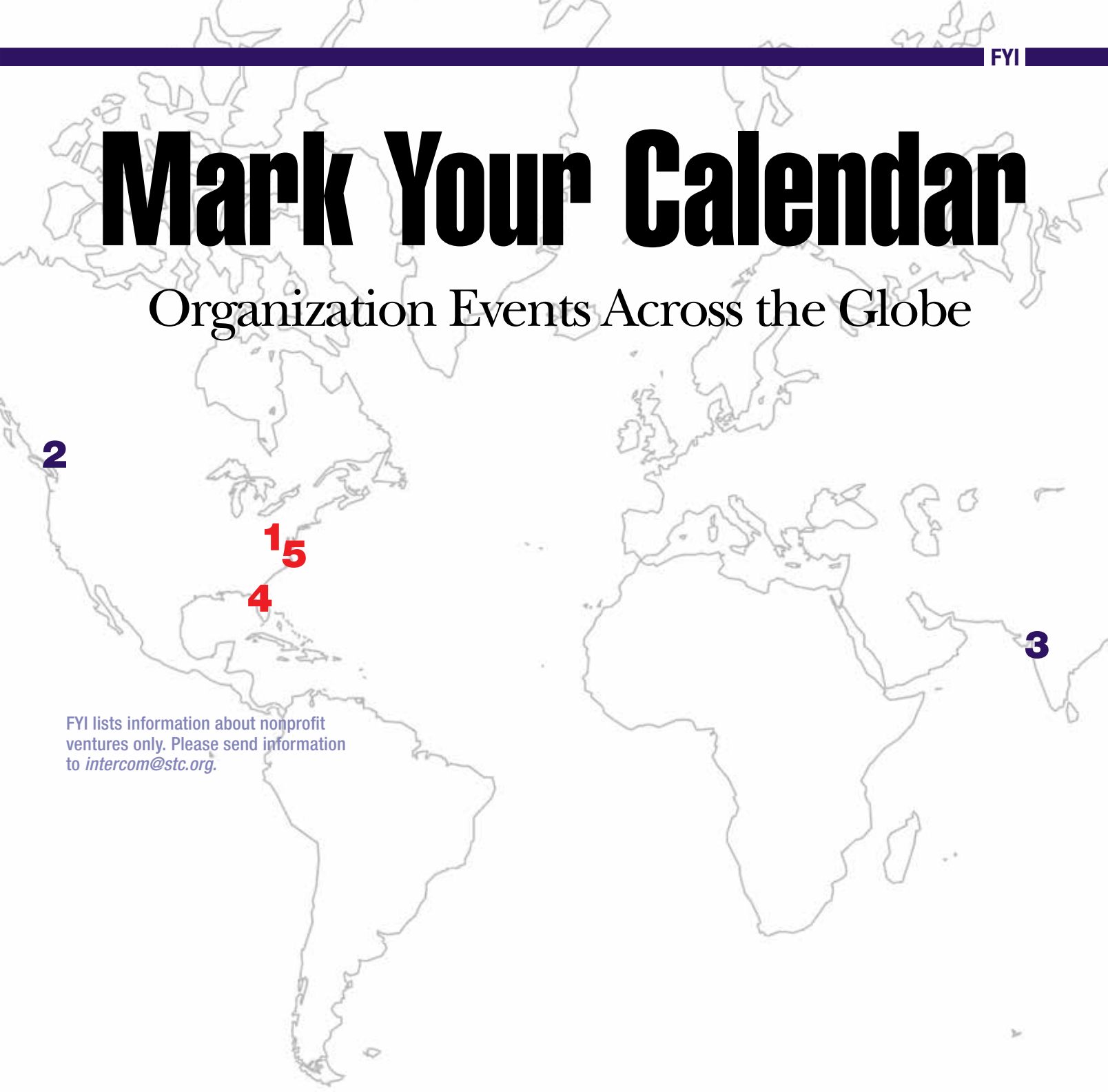

FYI lists information about nonprofit ventures only. Please send information to *intercom@stc.org.*

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AMWA
conference@amwa.org
240-238-0940

2 10-14 Nov
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ASIS&T
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301-495-0900

3 7-8 Dec
The **India Chapter of STC** will hold its 20th Annual Conference in Mumbai, India. For more information, contact STC India.
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https://stc-india.org/conferences/2018/
conference@stc-india.org

4 28-31 Jan 2019
The annual **Reliability and Maintainability Symposium (RAMS)** will be held at the Bay Lake Tower at Disney's Contemporary Resort, Lake Buena Vista, FL.
http://www.rams.org/
rams2019@rams.org

5 14-17 Feb 2019
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The Tech Comm Elevator Pitch: Answering the Question, "What Will You Be Doing, Exactly?"

BY CHARLES A. LAWRENCE | *STC Member*

IN A FEW SHORT WEEKS, I'll be starting my master's degree in the Technical Communications program at the University of Central Florida. I was thrilled about the news, and I told anyone who would listen. In fact, even though my car didn't need a wash, I got one anyway just so I could tell the car wash lady that I got accepted into graduate school. When she rang me up at the register, she congratulated me, although her enthusiasm was understated. I understood. I drive a used Honda Civic. The car wash lady probably sees luxury automobiles owned by people who completed their graduate degrees. Unlike graduate students, some of whom embrace weekly fasting to keep their heads above water.

I made a promise to myself that I'd return to that car wash after I finished my master's degree and began my climb into a higher tax bracket and into an Acura, BMW, or at least a new Honda Accord. Take that, car wash lady!

But she wasn't the first person who I told about being accepted into graduate school. The first person I told was my girlfriend. Thankfully, she doesn't care that I drive a used Honda Civic (a good reason to hold on to her). However, she wasn't quite sure what a technical writer was when I told her the news.

"What will you be doing, exactly?" she asked.

"Well, technical writers do a number of different things. They write software documentation, online help sections, a website's frequently asked questions, that sort of thing." I explained.

"Oh, okay," she replied.

"Many years ago, technical writers were best known for writing instruction manuals. Like when you had to assemble a bicycle," I explained further.

"Oh, right. My dad hated those instruction manuals," she said.

"Um. Well, instruction manuals have gotten a lot better since then," I said defending my future profession.

My girlfriend agreed and gave me a big, warm hug. It was a much nicer experience than telling the lady at the car wash.

A few days later, I told an acquaintance I was going to graduate school for technical communication.

"What will you be doing, exactly?" she asked.

I gave my acquaintance the same explanation I gave my girlfriend as to what a technical writer did. No hug, but I did receive a respectful "uh-huh," from my acquaintance. This is the type of "uh-huh" response that suggested my acquaintance heard me, but didn't want to know any details. I decided then that acquaintances are acquaintances precisely because they don't want to hear your details. Hearing the headlines is fine with them.

As proud as I am of myself, I've been putting off telling my father about pursuing a graduate degree. I'm afraid I'll get the same question from him that I got from my girlfriend and acquaintance. But I'm more afraid of his possible response.

"Instructional manuals for putting together bicycles? Yeah, I remember. I hated those things."

"Well, dad, instruction manuals have gotten a lot better since then."

It is common wisdom to have an elevator pitch at the ready when someone asks you what you do for a living (assuming it can't be easily deduced from your occupation's title: doctor, lawyer, teacher, or Elvis Impersonator).

An elevator pitch makes perfect sense, because people embrace the idea of having a better understanding about products and services they encounter. Maybe that's the simplest way to explain our purpose to others: we make things easier to understand.

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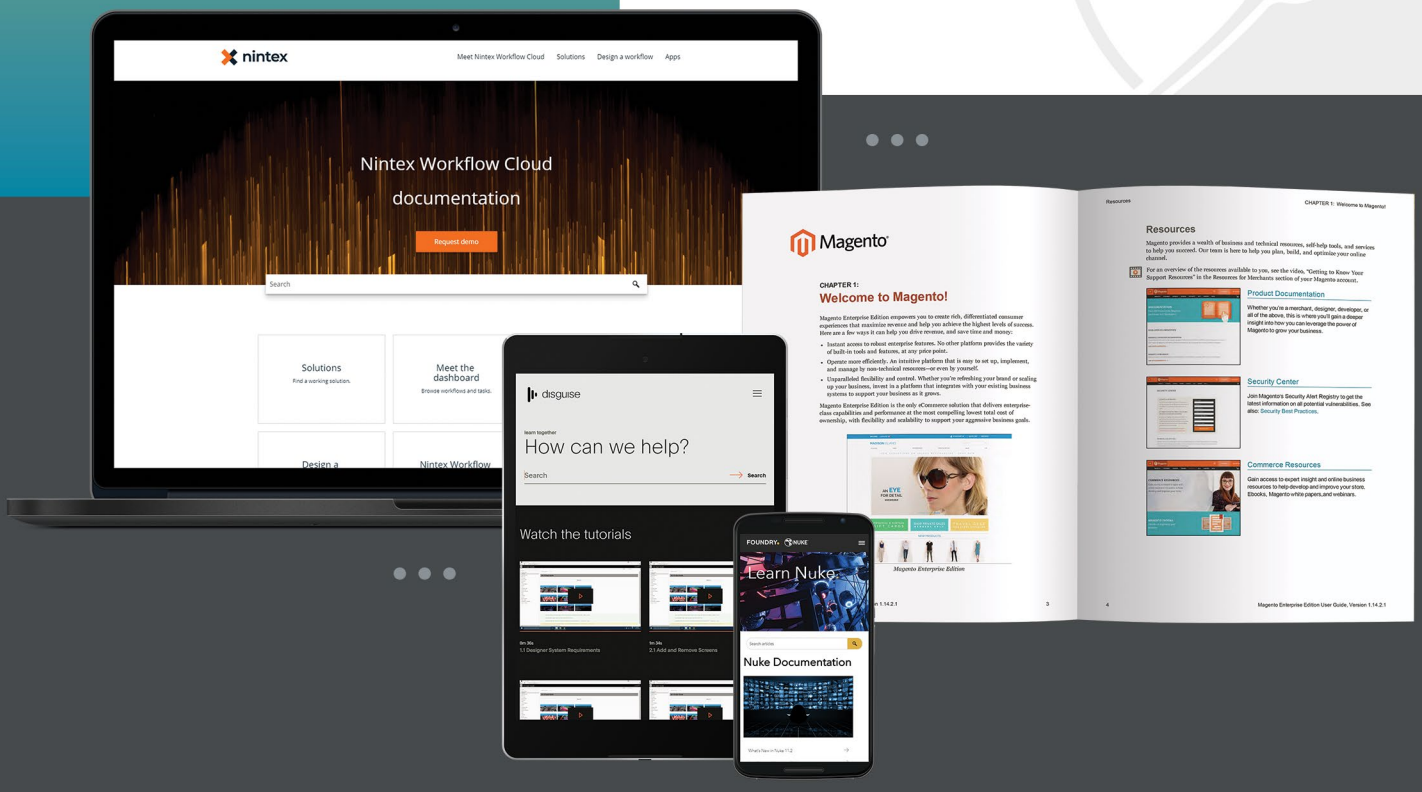

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